

# United States Resin Company

Tel. No.: 888-565-1102

Fax No.: 888-462-1101

## Material Safety Data Sheet

01/06/2009

### Section 1 – Product Identification

**Product/Chemical Name:** A-S1 CL Resin

**Chemical Formula:**  $(C_{12}H_{18}NCl)_n (C_{10}H_{10})_m$

**CAS Number:** 60177-39-1

**Other Designations:** Ethenyl-N,N,N-trimethyl benzenemethanaminium chloride and divinylbenzene polymer

**General Use:** Ion Exchange Resins

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**Emergency information:** Tel: 888-565-1102

### Section 2 - Composition / Information on Ingredients

Ingredient Name				CAS Number		% wt	
Ethenyl-N,N,N-trimethyl benzenemethanaminium chloride and divinylbenzene polymer				60177-39-1		52 - 58	
Water				07732-18-5		42 - 48	
Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
	TWA	STEL	TWA	STEL	TWA	STEL	IDLH
	None	None	None	None	None	None	None
<b>Trace Impurities:</b> Not Applicable							

### Section 3 – Hazards Identification

#### Potential Health Effects

**Primary Entry Routes:** Inhalation, Ingestion

**Target Organs:** None

**Acute Effects:**

**Inhalation:** Not expected to cause adverse effects. Dust could cause blockage of lower airways if very large amounts of dust are inhaled.

**Eye:** Irritation may occur. Corneal damage may occur if rubbing of eyes is allowed.

**Skin:** No data available.

**Ingestion:** No data available.

**Carcinogenicity:** IARC, NTP, and OSHA do not list A-S1CL Resin as a carcinogen.

**Medical Conditions Aggravated by long-term Exposure:** None Documented.

**Chronic Effects:** None Documented.

### Section 4 – First Aid Measure

**Inhalation:** Protect yourself with appropriate PPE, remove the person to fresh air. Decontaminate and begin rescue breathing if breathing has stopped and CPR if heart action has stopped. Seek prompt medical attention.

**Eye Contact:** DO NOT allow victim to rub or keep eyes tightly shut. Gently lift eyelids and immediately flush eyes with large amounts of water. Continue to flush for at least 30 minutes, occasionally lifting the upper and lower lids. Seek prompt medical attention.

**Skin Contact:** Quickly remove contaminated clothing. Immediately wash area with large amounts of water. Seek prompt medical attention for any reddened skin other than from washing.

**Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a Poison Control Center (PCC).  
Unless the PCC advises otherwise, have the conscious and alert person drink 1 to 2 glasses of water to dilute. Induce vomiting only after recent ingestions due to the possibility of seizures. Seek prompt medical attention.

## **Section 5 – Fire-Fighting Measures**

**Flash Point:** None Reported.

**Flash Point Method:** Not Applicable.

**Burning Rate:** None Reported.

**Auto Ignition Temperature:** None Reported.

**LEL:** None Reported.

**UEL:** None Reported.

**Flammability Classification:** Not Applicable.

**Extinguishing Media:** Carbon Dioxide, Dry Chemical, and Water.

**Unusual Fire or Explosion Hazards:** None Documented.

**Hazardous Combustion Products:** Carbon monoxide, carbon dioxide, amines and hydrogen chloride.

**Fire-Fighting Instructions:** Do not release runoff from fire control methods to sewers or waterways.

**Fire-Fighting Equipment:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

## **Section 6 – Accidental Release Measures**

**Spill/Leak Procedures:** Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind and keep out of low areas. Stop the source of any leak if can be done safely.

**Small Spills:** Absorb any spilled material with sand, earth, or other non-combustible absorbent.

**Large Spills:** For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.

**Cleanup:** Same as for small spills.

**Regulatory Requirements:** Follow applicable OSHA regulations (29 CFR 1910.120).

## **Section 7 – Handling and Storage**

**Handling Precautions:** No special handling precautions. See Section 8.

**Storage Requirements:** The product must be stored in a cool, ventilated place. Avoid direct sunlight. Avoid freezing and drying of resin. Store in tightly closed containers to prevent moisture contamination.

**Regulatory Requirements:** Follow all applicable local, State and Federal (OSHA, DOT, EPA) laws

## **Section 8 – Exposure Controls / Personal Protection**

**Engineering Controls:**

**Ventilation:**

The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release.

**Respiratory Protection:**

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134 and 1910.137) and, if necessary, wear a NIOSH approved

respirator Select respirator based on its suitability to provide adequate worker protection for given work conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit testing, periodic environmental monitoring, maintenance, inspection, cleaning and convenient, sanitary storage areas.

**Protective Clothing/Equipment:**

Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear splash-proof chemical goggles and face shield when working with liquid, unless full facepiece respiratory protection is worn. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

**Safety Stations:**

Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

**Contaminated Equipment:**

Separate contaminated work clothes from street clothes. Launder before reuse. Remove material from your shoes and clean personal protective equipment. Never take home contaminated clothing.

**Comments:**

Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the restroom, or apply cosmetics.

## **Section 9 – Physical and Chemical Properties**

**Physical State:** Solid

**Appearance and Odor:** Yellowish-white opaque beads with a slight amine odor.

**Odor Threshold:** Not Documented.

**Vapor Pressures:** Not Applicable.

**Vapor Density (Air=1):** Not Applicable.

**Formula Weight:** Not Documented.

**Density:** 685 gm/liter

**Specific Gravity (H<sub>2</sub>O=1, at 4°C):** 1.10

**pH:** Not Documented.

**Water Solubility:** Negligible

**Other Solubilities:** Not Documented.

**Boiling Point:** Not Applicable.

**Freezing/Melting Point:** Not Applicable.

**Viscosity:** Not Documented.

**Refractive Index:** Not Documented.

**Surface Tension:** Not Documented.

**% Volatile:** None

**Evaporation Rate:** Not Applicable.

## **Section 10 – Stability and Reactivity**

**Stability:** A-S1CL Resin is stable at room temperature in closed containers under normal storage and handling conditions.

**Polymerization:** Hazardous polymerization cannot occur.

**Chemical Incompatibilities:** Strong oxidizers such as nitric acid.

**Conditions to Avoid:** None

**Hazardous Decomposition Products:** Thermal oxidative decomposition of A-S1CL Resin can produce carbon

monoxide, carbon dioxide and amines, and hydrogen chloride.

## **Section 11 – Toxicological Information**

**Eye Effects:** No data available.

**Skin Effects:** No data available.

**Acute Inhalation Effects:** No data available.

**Acute Oral Effects:** No data available.

**Chronic Effects:** No data available.

**Carcinogenicity:** No data available.

**Mutagenicity:** No data available.

**Teratogenicity:** No data available

## **Section 12 – Ecological Information**

**Ecotoxicity:** No data available.

**Environmental Fate:** No data available.

**Environmental Degradation:** No data available.

**Soil Absorption/Mobility:** No data available.

## **Section 13 – Disposal Considerations**

**Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

**Disposal Regulatory Requirements:** If this product becomes a waste, it does not meet the criteria of a hazardous waste defined in 40 CFR 261. If this product becomes a waste after its intended use, it could become a hazardous waste and all applicable Federal, State and local regulations should be followed.

**Container Cleaning and Disposal:** Follow all applicable Federal, State and local regulations.

## **Section 14 – Other Information**

### **Abbreviations:**

ACGIH - American Conference of Governmental Industrial Hygienist

OSHA - Occupational Safety and Health Administration

TLV - Threshold Limit Value

PEL - Permissible Exposure Limit

TWA - Time Weighted Average

STEL - Short Term Exposure Limit

TSCA - Toxic Substance Control Act

RCRA - Resource Conservation Recovery Act

IDLH - Immediately Dangerous to Life and Health

Judgements as to the suitability of information herein are the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, the manufacturer, and its agents and distributors extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

# United States Resin Company

1001 E. Harmony Road, Suite A #211

Fort Collins, CO 80525

Tel. No.: 888-565-1102

Fax No.: 888-462-1101

## Material Safety Data Sheet

**Product Name:** C-8(H) , C-8L (H), C-8FM(H), C-8B(H), C-8LB(H),  
C-10(H) , C-10L (H), C-10FM(H), C-10B(H), C-10LB(H),  
Gel, Strong Acid, Hydrogen Form Cation Exchange Resin (8-10% DVB)

**Effective date:** 10/10/02

### Information Numbers:

**Tel. No.:** 888-565-1102

**Fax No.:** 888-492-1101

**Emergency information:** Tel: 888-565-1102

### 1. Ingredients:

**Sulfonated copolymer of Styrene and  
divinylbenzene in the hydrogen form CAS# 69011-20-7**

**Water CAS# 007732-18-5**

This document is prepared pursuant to the OSHA Hazard Communication Standard (29CFR 1910.1200). In Addition, other substances not hazardous per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

### 2. Physical / Chemical Data:

**Boiling Point:** Not Applicable

**Vapor Pressure (MM HG):** Not Applicable

**Evaporation Rate (water = 1):** 1

**Appearance & Odor:** Amber solid beads. No to low odor.

**Specific Gravity:** 1.2 (water = 1)

**Melting Point (deg. F):** Not Applicable

**Solubility in Water:** Insoluble

**Thermal:** May yield oxides of carbon and nitrogen

**Vapor Density:** Not Applicable

Product Hazard Rating	Scale
Toxicity = 0	0 = Negligible
Fire = 0	1 = Slight
Reactivity = 0	2 = Moderate
Special N/A	3 = High
	4 = Extreme

### 3. Fire & Explosion Hazard Data

**Flammable Limits:** 800 ° Deg. F

**Unusual Fire & Explosion Hazards:** Product is not combustible until moisture is removed, Then resin starts to burn in flame at 230 C. Autoignition occurs above 500C. Possible fire.

**Combustion Products:** Hazardous combustion products may include and are not Limited to : hydrocarbons, sulfur oxides, organic sulfonates, Carbon monoxide, carbon dioxide, benzene compounds.

**Extinguishing Media:** Water, CO2, Talc, Dry Chemical

**Special Fire Fighting Procedures:** MSHA / NIOSH approved self-contained breathing gear.

### 4. Reactivity Data

**Stability:** Stable

**Conditions to Avoid:** Temperatures above 400 ° F

**Hazardous by Products:** See Section 3 above for possible combustion products.

**Materials to avoid contact with:** Strong oxidizing agents (i.e. nitric acid)

**Hazardous Polymerization:** Material does not polymerize

**Storage:** Store in a cool dry place

### 5. Health Hazards & Sara ( Right to Know)

**Emergency First Aid Procedures:** Contact with eyes can and skins can cause irritation.

**Skin Absorption:** Skin absorption is unlikely due to physical properties.

**Ingestion:** Single dose oral LD50 has not been determined. Single Does oral toxicity is believed to be low. No hazards anticipated from ingestion incidental to industrial exposure.

**Inhalation:** Vapors are unlikely due to physical properties.

**Systemic & Other Effects:** No specific data available, however, repeated exposures are not anticipated to cause any significant adverse effects.

**Carcinogenicity:** Not Applicable

**SARA Title 3, sections 311 & 312:** All ingredients are non-hazardous

## 6. First Aid

**Eyes:** Irrigate immediately with water for at least 5 minutes. Mechanical irritation only.

**Skin:** No adverse effects anticipated by this route of exposure.

**Ingestion:** No adverse effects anticipated by this route of exposure incidental to proper industrial handling.

**Inhalation:** No adverse effects anticipated by this route of exposure.

## 7. Control Measures

**Respiratory protection:** Not required for normal uses if irritation occurs from breathing-get fresh air.

**Eye protection:** Splash goggles

**Ventilation:** Normal

**Protective Gloves:** Not required.

## 8. Safe handling procedures

**In Case of Spills:** Sweep up material and transfer to containers. Use caution the floor will be slippery!

**Disposal Method:** Bury resin licensed landfill or burn in approved incinerator according to local, state, and federal regulations. For resin contaminated with hazardous material, dispose of mixture as hazardous material according to local, state and federal regulations.

## 9. Additional Information:

**Special precautions to be taken in handling and storage:** Practice reasonable care and caution. Metal equipment should be compatible with feed, regenerant, resin form, and effluent of that process.

**TSCA Considerations:** Every different salt or ionic form of an ion-exchange resin is a separate chemical. If you use an ion-exchange resin for ion-exchange purposes and then remove the by-product resin from its vessel or container prior to recovery of the original or another form of the resin or of another chemical, the by-product resin must be listed on the TSCA Inventory (unless an exemption is applicable). It is the responsibility of the customer to ensure that such isolated, recycled by-product resins are in compliance with TSCA. Failure to comply could result in substantial civil or criminal penalties being assessed by the Environmental Protection Agency.

**MSDS Status:** Canadian regulatory information added.

## 9. Regulatory Information: (Not meant to be all-inclusive-selected regulations represented.)

**Notice:** The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another, it is the buyer responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSDS Sheet for health and safety information.

## 6. First Aid

**Eyes:** Irrigate immediately with water for at least 5 minutes. Mechanical irritation only.

**Skin:** No adverse effects anticipated by this route of exposure.

**Ingestion:** No adverse effects anticipated by this route of exposure incidental to proper industrial handling.

**Inhalation:** No adverse effects anticipated by this route of exposure.

## 7. Control Measures

**Respiratory protection:** Not required for normal uses if irritation occurs from breathing-get fresh air.

**Eye protection:** Splash goggles

**Ventilation:** Normal

**Protective Gloves:** Not required.

## 8. Safe handling procedures

**In Case of Spills:** Sweep up material and transfer to containers. Use caution the floor will be slippery!

**Disposal Method:** Bury resin licensed landfill or burn in approved incinerator according to local, state, and federal regulations. For resin contaminated with hazardous material, dispose of mixture as hazardous material according to local, state and federal regulations.

## 9. Additional Information:

**Special precautions to be taken in handling and storage:** Practice reasonable care and caution. Metal equipment should be compatible with feed, regenerant, resin form, and effluent of that process.

**TSCA Considerations:** Every different salt or ionic form of an ion-exchange resin is a separate chemical. If you use an ion-exchange resin for ion-exchange purposes and then remove the by-product resin from its vessel or container prior to recovery of the original or another form of the resin or of another chemical, the by-product resin must be listed on the TSCA Inventory (unless an exemption is applicable). It is the responsibility of the customer to ensure that such isolated, recycled by-product resins are in compliance with TSCA. Failure to comply could result in substantial civil or criminal penalties being assessed by the Environmental Protection Agency.

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## **11. Canadian Regulations:**

**WHMIS Information:** The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is: This product is not controlled Product under WHMIS.

**Canadian TDG Information:** For guidance, the Transportation of Dangerous Good Classification for this product is not regulated.

# United States Resin Company

1001 E. Harmony Road, Suite A #211

Fort Collins, CO 80525

Phone 888-565-1102 \* Fax 888-462-1101

## A-S1 Cl

### TYPE I STRONG BASE ANION EXCHANGE RESIN

#### Product Description

US Resin's A-S1 Cl resin is a high-capacity, conventional gel polystyrene Type I strong base anion exchange resin designed for use in commercial or industrial demineralizer water equipment. The resin is typically converted to the hydroxide form ( $\text{OH}^-$ ) prior to use. The resin removes all anion ions, such as sulfate, chloride, bicarbonate, and silica by replacing them with hydroxide ions. When the resin bed is exhausted the weakest anion ions (such as silica) begin to pass through the bed. Functionality is returned by regeneration with diluted sodium hydroxide solution. The capacity obtained depends largely on the amount of regenerant used in the regeneration and the water quality being treated. Typically 6 - 12 lbs of chemical per ft<sup>3</sup> is used to obtain maximum capacity of up to

#### Typical Physical, Chemical & Operating Characteristics

Polymer Structure	Polystyrene cross-linked with Divinylbenzene
Physical Form and Appearance	Tough amber spherical beads
Whole Bead Count	90% Min.
Functional Groups	$-\text{N}^+(\text{CH}_3)_3$
Ionic Form (as shipped)	$\text{Cl}^-$
Shipping Weight, approx.	705 g/l (44 lb./ft. <sup>3</sup> )
Mesh Size (US Std.)	16-50
Moisture retention, $\text{Cl}^-$ form	42-48%
Swelling, $\text{Cl}^- \rightarrow \text{OH}^-$	20% max.
Total Exchange Capacity when regenerated in chloride form	1.4 meq/mL
pH Range, Stability	0-14
Minimum in service Bed Depth	24"
Typical Backwash Velocity	1.5—2.5 gpm/ft <sup>2</sup>
Bed Expansion during Backwash	50—75%
Specific Service Flow	1.5 gpm/ft <sup>2</sup>
Regenerant	NaOH or NaCl
Regeneration Flow Rate	0.2—0.5 gpm/ft <sup>2</sup>
Regenerant Contact Time	30—60 minutes
Slow Rinse Rate	0.2—0.5 gpm/ft <sup>2</sup>
Fast Rinse Rate	2 gpm/ft <sup>2</sup>
Maximum Influent Free Chlorine	1 ppm
Maximum Iron and Heavy metals	1 ppm

#### CHEMICAL AND THERMAL STABILITY

US Resin's A-S1 (Cl) resin is insoluble in dilute or moderately concentrated acids, alkalies, and in all common solvents. However, exposure to significant amounts of free chlorine, "hypochlorite" ions or other strong oxidizing agents over long periods of time will eventually break down the crosslinking. This will tend to increase the moisture retention of the resin, decreasing its mechanical strength as well as generating small amounts of extractable breakdown products. Like all conventional Polystyrene Type I anion resins, it is thermally stable to 90 °C (195 °F) in the salt form. The hydroxide form tends to degrade in water temperatures appreciably higher than 70 °C (160 °F), thereby losing capacity, as the functional groups are gradually replaced by hydroxyl groups.

# United States Resin Company

1001 E. Harmony Road, Suite A #211  
Fort Collins, CO 80525  
Phone 888-565-1102 \* Fax 888-462-1101

## C-8B H

### STRONG ACID CATION EXCHANGE RESIN

(Designed for use in high purity industrial water applications)

#### Product Description

US Resin's C-8B H resin is a high-capacity, conventional gel polystyrene strong acid cation exchange resin designed for use in industrial water and waste equipment. Cation resin in hydrogen form removes positive ions such as calcium, magnesium, potassium and sodium by replacing them with hydrogen. When the resin bed is exhausted the positively charged ions begin to pass through the bed. Functionality is returned by regeneration with diluted sulfuric or hydrochloric acid solution. The capacity obtained depends largely on the amount of acid used in the regeneration.

US Resin's C-8B H resin is also capable of removing in the same way dissolved iron, manganese, and also suspended matter by virtue of the filtering action of the bed.

#### Typical Physical, Chemical & Operating Characteristics

Polymer Structure	Polystyrene 8% cross-linked with Divinylbenzene
Physical Form and Appearance	black spherical beads
Whole Bead Count	90% min.
Functional Groups	Polystyrene sulfonate
Ionic Form (as shipped)	H+
Shipping Weight, approx.	850 g/l (53 lb./ft. <sup>3</sup> )
Mesh Size (U.S. Std.)	6-50
Moisture retention, H+ form	50-56%
Swelling, Na+→H+	5% max.
Total Capacity	1.9 meq/ml
pH Range, Stability	0-14

#### Complies with FDA Regulations for Potable Water Applications

Conforms to paragraph 21CFR 173.25 of the Food Additives Regulations of the F.D.A.

#### Complies with USDA Regulations for Potable Water Systems

Meets standards for use in systems operating under the Federal meat and poultry products inspection program.

#### CHEMICAL AND THERMAL STABILITY

US Resin's C-8B H resin is insoluble in dilute or moderately concentrated acids, alkalies, and in all common solvents. However, exposure to >1 ppm of free chlorine, "hypochlorite" ions, or other strong oxidizing agents over long periods of time will eventually break down the cross-linking. Temperature over 30 °C (85 °F) will accelerate the oxidation. This will tend to increase the moisture retention of the resin, decreasing its mechanical strength, as well as generating small amounts of extractable breakdown products. Like all conventional Polystyrene sulfonated resins, it is thermally stable to higher than 132 °C (270 °F) in the alkali (for instance, sodium) or alkaline earth (calcium and magnesium) salt forms. The free acid form tends to hydrolyze in water temperatures appreciably higher than 120 °C (250 °F) thereby losing capacity as the functional groups are gradually replaced by hydroxyl groups.